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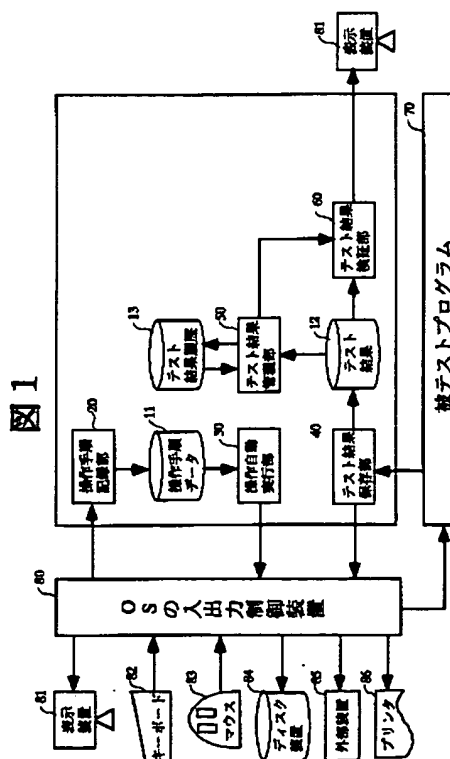
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(54) 【発明の名称】 プログラムテスト支援装置

(57) 【要約】

【課題】 画面やファイル、外部装置等のテスト対象のプログラムから出力される全ての情報を時系列に残し、画面の遷移を容易に確認でき、また予測しない画面の変更に対しても容易に対処でき、さらには性能の劣化を評価することができるプログラムテスト支援装置を提供すること。

【解決手段】 被テストプログラムを前記操作手順データに従って動作させるオペレーティングシステムとの間に介在し、被テストプログラムから画面、ファイル、外部装置に出力される全ての情報を時系列に取得し、取得した時刻の情報と共にテスト結果情報として保存するテスト結果保存手段と、複数回のテスト結果をテスト結果履歴として保存するテスト結果履歴保存手段と、テスト時刻の異なる2つのテスト結果情報を前記テスト結果履歴保存手段から取り出して比較することにより差分を抽出する比較手段と、抽出された差分で示される情報のみを表示する表示手段とを備える。



【特許請求の範囲】

【請求項 1】 被テストプログラムをテストするための操作手順を操作手順データとして保存しておき、その保存しておいた操作手順データを被テストプログラムに与えて被テストプログラムのテストを行うプログラムテスト支援装置において、

被テストプログラムを前記操作手順データに従って動作させるオペレーティングシステムとの間に介在し、被テストプログラムから出力される全ての情報を時系列に取得し、取得した時刻の情報と共にテスト結果情報として保存するテスト結果保存手段と、

複数回のテスト結果をテスト結果履歴として保存するテスト結果履歴保存手段と、

テスト時刻の異なる 2 つのテスト結果情報を前記テスト結果履歴保存手段から取り出して比較することにより差分を抽出する比較手段と、

抽出された差分で示される情報のみを表示する表示手段と、を備えることを特徴とするプログラムテスト支援装置。

【請求項 2】 前記テスト結果保存手段に保存する被テストプログラムから出力される全ての情報を出力命令形式の文字列情報として前記テスト結果保存手段に保存する出力命令文字列変換手段を備えることを特徴とする請求項 1 記載のプログラムテスト支援装置。

【発明の詳細な説明】**【0001】**

【発明の属する技術分野】本発明は、画面操作を行いながら新規に開発したプログラムのテストの支援を行うプログラムテスト支援装置に関するものである。

【0002】

【従来の技術】従来、この種のプログラムテスト支援装置として、例えば特開平 5-274186 号公報に開示されたものが知られている。

【0003】従来の技術を特開平 5-274186 号を例に挙げて説明すると、この特開平 5-274186 号（発明の名称：入力データ処理装置）では、オペレータの操作指示の情報をロギングしておき、その情報を再度実行することでプログラムのテストを自動化している。テストの結果については、比較の必要な画面については、テスト操作の中で画面のログをとるキーを入力し、指示された時点での画面のハードコピーをファイル化して 2 度目のテストの結果と比べようになっている。

【0004】

【発明が解決しようとする課題】しかしながら、上記の従来技術にあっては、次のような問題点がある。

【0005】（1）オペレータの指示のない画面については画面のログが取得されない。したがって、予め変更が予測できる画面についてはログを取得しておく操作を指示できるが、テスト対象のプログラムの変更に伴い、予測しない画面の変更が起きた場合などには対応するこ

とができない。

【0006】（2）特開平 5-274186 号では、画面の中でプリンクしているフィールドに対して、プリンクを止めてから画面のハードコピーを取得することが特徴となっているが、画面のエラーメッセージのようにプリンクすることが仕様として要求されているフィールドに対して、画面の状態を変更してしまうことにより、プリンクしていたのか、していなかったのかの確認ができなくなってしまう。

【0007】（3）画面のログを取得する行為をテストのオペレーションと同一レベルで扱ってしまうため、画面の出現順序や画面の追加や削除といった画面の流れの確認はできない。

【0008】（4）画面のログを取得するために特別なキーが必要であり、現在のように表示装置上に複数のプログラムの実行を示す画面が表示されている場合、目的のプログラムの出力する画面の情報だけを取得する機能が必要であり、目的以外のプログラムの出力する画面に依存しないテストを実行する必要がある。また、特開平 5-274186 号では、すべての画面情報をログに取得してしまうため、同時に実行しているプログラムがある場合、画面の情報が異なる可能性が高くなり、正常にテストを実施するには、表示装置全体を一つのプログラムの出力する画面とする必要がある。

【0009】（5）出力のタイミングが記録できていないため、性能の劣化が起きていることを比較することができない。

【0010】（6）テスト対象のプログラムによっては、画面出力だけでなく、ファイル出力や外部プログラムへのメッセージ出力など、出力するデータが多種あるが、上記従来技術はすべての出力情報に対して配慮していない。

【0011】本発明の目的は、画面やファイル、外部装置等のテスト対象のプログラムから出力される全ての情報を時系列に残し、画面の遷移を容易に確認でき、また予測しない画面の変更に対しても容易に対処でき、さらには性能の劣化を評価することができるプログラムテスト支援装置を提供することにある。

【0012】

【課題を解決するための手段】上記目的を達成するために、本発明は、被テストプログラムをテストするための操作手順を操作手順データとして保存しておき、その保存しておいた操作手順データを被テストプログラムに与えて被テストプログラムのテストを行うプログラムテスト支援装置において、被テストプログラムを前記操作手順データに従って動作させるオペレーティングシステムとの間に介在し、被テストプログラムから画面、ファイル、外部装置に出力される全ての情報を時系列に取得し、取得した時刻の情報と共にテスト結果情報として保存するテスト結果保存手段と、複数回のテスト結果をテ

スト結果履歴として保存するテスト結果履歴保存手段と、テスト時刻の異なる２つのテスト結果情報を前記テスト結果履歴保存手段から取り出して比較することにより差分を抽出する比較手段と、抽出された差分で示される情報のみを表示する表示手段とを備えることを特徴とする。

【0013】また、前記テスト結果保存手段に保存される保存被テストプログラムから画面、ファイル、外部装置に出力される全ての情報を出力命令形式の文字列情報として前記テスト結果保存手段に保存する出力命令文字列変換手段を備えることを特徴とする。

【0014】

【発明の実施の形態】以下、本発明を図面に示す実施形態に基づいて詳細に説明する。

【0015】図１は、本発明を適用したプログラムテスト支援装置の実施形態を示すブロック図である。

【0016】本実施形態のプログラムテスト支援装置１０は、操作手順を記録した操作手順データファイル１１、テスト実行時に出力された情報を格納したテスト結果ファイル１２、何度かテストを繰り返すときに過去のテスト結果をテスト結果履歴として保存しているテスト結果履歴ファイル１３、オペレータの操作手順を記録する操作手順記録部２０、操作を操作手順データファイル１１中の操作手順に基づき自動で実行する操作自動実行部３０、被テストプログラム７０が出力する情報を保存するテスト結果保存部４０、テストを繰り返し実行する場合に過去のテスト結果を保存したり、比較のために過去のテスト結果を取り出したりするテスト結果管理部５０、テストして得られた結果を過去の結果と比較するテスト結果検証部６０で構成されている。

【0017】テストの対象となる被テストプログラム７０が動作する計算機システムの環境は、オペレーティングシステム（以下、ＯＳ）の入出力制御部８０、ディスプレイなどの表示装置８１、文字やコマンド等を入力するためのキーボードなどの入力装置８２、マウスなどのポインティング装置８３、ファイルなどを格納するディスクなどの外部記憶装置８４、外部ネットワークやシリアルインタフェースなどの外部装置８５、プリンタ装置８６を備えている。なお、テスト結果検証部６０の検証結果は、表示装置８１に表示される。

【0018】まず、この実施形態の動作の概要について説明する。

【0019】被テストプログラム７０に対するオペレータの入力情報をＯＳの入出力制御部８０から取得し、操作手順記録部２０が操作手順データファイル１１に記録する。被テストプログラム７０が出力する情報は、ＯＳの入出力制御部８０に命令を渡す前に、テスト結果保存部４０がテスト結果ファイル１２に記録する。

【0020】２回目のテストを始める前に、テスト結果管理部５０を使って１回目のテスト結果をテスト結果フ

ァイル１２から取得し、テスト結果履歴ファイル１３に転送する。

【0021】以降のテストは、１回目のテストで操作手順データファイル１１に記録した操作手順データに基づき操作自動実行部３０がＯＳの入出力制御部８０に命令を送る。ＯＳの入出力制御部８０は受け取った命令を、キーボード等の入力装置８２やポインティング装置８３からの指示と同様に処理し、被テストプログラム７０に渡す。

【0022】被テストプログラム７０が出力する情報を１回目と同じようにテスト結果保存部４０がテスト結果ファイル１２に記録する。１回目に記録したテスト結果Ａと、２回目のテスト結果Ｂとを比較するために、１回目のテスト結果Ａをテスト結果管理部５０を使ってテスト結果履歴ファイル１３から取り出す。

【0023】テスト結果検証部６０は、取り出した１回目のテスト結果Ａと２回目のテスト結果Ｂを使い、テスト結果の違いを表示装置８１に出力する。

【0024】図２は、テスト結果保存部４０の機能の詳細を示す機能ブロック図である。図中の４１は画面に出力する命令をテスト結果に記録する画面出力機能、４２は外部記憶装置８４のファイルに出力する命令をテスト結果に記録するファイル出力機能、４３はプリンタ装置８６に出力する命令を記録するプリンタ出力機能、４４は外部装置８５に出力する命令を記録する外部装置出力機能である。

【0025】前記画面出力機能４１において、４１１は画面出力機能４１の内部の詳細機能である出力命令を文字列に変換する出力命令文字列変換機能、４１２は変換した文字列を格納する文字列格納エリア、４１３は文字列をテスト結果ファイル１２に出力するファイル出力機能である。

【0026】一方、ＯＳの入出力制御部８０において、８０１は表示装置８１に表示画面内容を直接出力する画面出力機能、８０２は同じく外部記憶装置８４にファイルデータなどを直接出力するファイル出力機能、８０３は同じくプリンタ装置８６にプリントデータを直接出力するプリンタ出力機能、８０４は同じく外部装置８５に外部出力データを直接出力する外部装置出力機能である。

【0027】図３は、テスト結果を記録する方法を示すフローチャートである。図２と図３を参照し、画面出力の情報をテスト結果ファイル１２に記録する方法を説明する。

【0028】被テストプログラム７０は、表示装置８１に表示する場合は、ＯＳの入出力制御部８０の画面出力機能８０１を使用する。本実施形態では、被テストプログラム７０が直接、画面出力機能８０１を使用するのではなく、テスト結果保存部４０の画面出力機能４１を使用する。

【0029】まずはじめに、被テストプログラム70は、テスト結果保存部40の画面出力機能41に画面出力命令を送る(図3のステップ301)。画面出力機能41は画面出力命令を受け取ると(ステップ302)、その受け取った命令を出力命令文字列変換機能411を使い文字列に変換し、文字列エリア412にセットする(ステップ303)。

【0030】文字列に変換する理由は、テスト結果の検証を簡単にするためである。次に、変換した文字列に時刻、画面名などの必要情報を付加した後(ステップ304)、文字列エリア412の内容をファイル出力機能413によりテスト結果ファイル12に出力する(ステップ305)。

【0031】これにより、被テストプログラム70が画面に出力する情報は、出力命令形式の文字列に変換され、かつ時刻、画面名などの情報が付加されてテスト結果ファイル12に時系列で記録される。出力命令形式の文字列に変換してテスト結果ファイル12に記録することにより、テスト結果ファイル12の記憶容量をドットイメージで記録する場合に比べて小さくすることができる。また、画面の情報をイメージデータで取得するとブリンクしている項目などを正しく記録できないが、画面上に文字や線を描画する機能を実行する度に描画情報を出力命令形式の文字列情報(スクリプト言語)で記録することにより、描画された文字や線の属性を正確な情報として記録することができる。

【0032】図4は、テスト結果管理部50とテスト結果検証部60の詳細構成を示す機能ブロック図である。図中の12aはテスト結果履歴ファイル13中に格納される最新のテスト結果であり、12bは過去のテスト結果である。501は最新のテスト結果12aからテスト実行の日時を取得するモジュール、502はテスト結果12aをテスト結果履歴ファイル13に格納するテスト履歴格納モジュールである。

【0033】503はテスト結果履歴ファイル13の中から指定された過去のテスト結果12bを取り出すテスト履歴取り出しモジュール、504は過去のテスト結果12bとして必要な日時の情報を入力装置82から取得する日時指定モジュールである。

【0034】一方、テスト結果検証部60において、601は最新のテスト結果12aと過去のテスト結果12bを入力して、テスト結果の差分を出力するテスト結果比較部、602はテスト結果の差分情報を格納するテスト結果差分情報ファイル、603は求めた差分情報を表示装置81に出力する差分表示部である。この差分表示部603の内部は、テスト結果差分情報ファイル602に格納された差分情報から表示装置81に表示するための命令語を生成する画面出力命令生成モジュール604と、生成した命令文を格納する命令文格納エリア605、この命令文格納エリア605に格納した命令文をO

Sの入出力制御部80を使用して表示装置81に出力するOSの画面出力命令実行モジュール606から構成されている。

【0035】図5(a)、(b)は、テスト結果ファイル12の内容を示す図である。同図(a)はテスト結果ファイル12に格納されている内容の詳細、同図(b)は表示装置81に実際に出力された画面の例である。1201は画面に出力した内容を表す識別子、この場合はボタンを表している。1202はボタンに表示する文字列、1203はボタンの形式を表すコード、1204はボタンを表示する位置をx、y座標で表す。1205はボタンの大きさをx、y方向に表す。位置と大きさの単位はドットである。1206はこのボタンがどの画面に出力されたのかを識別するための識別子であり、この場合は、画面の名称である「確認」の文字列が使われている。1207は実際に表示装置81に出力された画面、1208は画面の名称が表示されている部分、図中の数字は起点1213からの距離をドット単位で表している。1209はテキスト入力フィールドを表す記録結果、1210はボタンを表す記録結果、1211は実際の画面に出力されたテキスト入力フィールド、1212は実際の画面に出力されたボタンを表す。

【0036】図示のように、ボタン1212は、起点1213を基準にして、ボタンを表示する位置座標1204で指定されるドット位置に、ボタンの大きさを表すx、y方向の大きさの情報1205で指定される大きさ表示される。テキスト入力フィールド1211についても同様に、記録結果1209の中のx、y座標の値に従って表示される。

【0037】図6は、複数回テストを実行する場合のテスト結果履歴をテスト結果履歴ファイル13に格納する手順を示したフローチャートである。図4を参照して説明する。

【0038】まず、最新のテスト結果12aからテストした日時を日時取得モジュール501で取得する(ステップ6001)。次に、ファイルの属性として、取得したテスト実施日時を付加する(ステップ6002)。次に、テスト履歴格納モジュール502が、最新のテスト結果12aをテスト結果履歴ファイル13に格納する(ステップ6003)。

【0039】図7および図8は、テスト結果検証部60の動作を説明する図である。図7において、701は1回目のテスト結果ファイル12の内容であり、図中の2重線は2回目のテストで値が変わった内容を示す。705はテキスト入力フィールドであり、706は文字列がOKと表示されるボタン、707は文字列にキャンセルと表示されるボタン、702は2回目のテスト結果ファイル12の内容であり、図中の2重線は1回目と値が変わった内容を示す。708はテキスト入力フィールド、709は文字列に送信と表示されるボタンであり、70

5～710には出力日時が付加されている。710は文字列にキャンセルと表示されるボタン、703は1回目と2回目のテスト結果の差分情報602、711は1回目と表示位置が異なったテキスト入力フィールド、712は1回目と文字列と表示位置が異なったボタンである。701の先頭行の出力日時と最終行の出力日時の時間間隔と702の先頭行の出力日時と最終行の出力日時の時間間隔を比較することでプログラム全体の動作時間の差分が求められる。

【0040】また、705の出力日時と706の出力日時の時間間隔と707の出力日時と708の出力日時の時間間隔を比較することにより、各部分でのプログラムの動作時間の差分が得られる。

【0041】次に、図8において、704はテスト結果差分情報703を画面に表示した結果、713は表示位置が変更になったテキスト入力フィールド、714はボタンの文字列と表示位置が変わったボタンを示す。

【0042】以上のように本実施形態によれば、テスト結果ファイル12の内容を単純にテキストレベルで比較するだけで、被テストプログラム70における画面操作が変更になった部分を抽出し、表示装置81に表示し、変更部分を確認することができる。従って、テスト対象のプログラムの変更に伴い、予測しない画面の変更が起きた場合に、容易に対処することができる。また、出力日時の情報から出力時間間隔を比較することで、ファイルやデータの出力単位で性能の劣化を検出することができる。

【0043】さらに、出力命令形式の文字列に変換してテスト結果ファイル12に記録することにより、テスト結果ファイル12の記憶容量をドットイメージで記録する場合に比べて小さくすることができる。また、画面の情報をイメージデータで取得するとブリンクしている項目などを正しく記録できないが、画面上に文字や線を描画する機能を実行する度に描画情報を出力命令形式の文字列情報（スクリプト言語）で記録することにより、描画された文字や線の属性を正確な情報として記録することができる。

【0044】さらに、プログラムテスト支援装置10をOSの入出力制御部80との間に介在させ、被テストプログラムが出力する全ての情報を取得しているため、画面上に複数のプログラムの実行画面が表示されているマルチタスク環境においても、目的とする1つの被テストプログラムの出力情報のみを取得し、テスト結果を確認することができる。

【0045】

【発明の効果】以上の説明から明らかなように、本発明によれば、画面やファイル、外部装置等のテスト対象のプログラムから出力される全ての情報を時系列に残し、画面の遷移を容易に確認でき、また予測しない画面の変

更に対しても容易に対処でき、さらには性能の劣化を評価することができる。

【0046】また、プログラムテスト支援装置をOSの入出力装置との間に介在させ、被テストプログラムが出力する全ての情報を取得しているため、画面上に複数のプログラムの実行画面が表示されているマルチタスク環境においても、目的とする1つの被テストプログラムの出力情報のみを取得し、テスト結果を確認することができる。

【0047】さらに、出力命令形式の文字列に変換してテスト結果ファイルに記録することにより、テスト結果ファイルの記憶容量をドットイメージで記録する場合に比べて小さくすることができる。また、画面の情報をイメージデータで取得するとブリンクしている項目などを正しく記録できないが、画面上に文字や線を描画する機能を実行する度に描画情報を出力命令形式の文字列情報（スクリプト言語）で記録することにより、描画された文字や線の属性を正確な情報として記録することができる。

【図面の簡単な説明】

【図1】本発明を適用したプログラムテスト支援装置の実施形態を示すブロック図である。

【図2】テスト結果保存装置の機能の詳細を示す機能ブロック図である。

【図3】テスト結果を記録する方法を示すフローチャートである。

【図4】テスト結果管理装置とテスト結果検証装置の詳細構成を示す機能ブロック図である。

【図5】テスト結果ファイルの内容を示す図である。

【図6】複数回テストを実行する場合のテスト結果履歴をテスト結果履歴ファイルに格納する手順を示したフローチャートである。

【図7】テスト結果検証装置の動作を説明する図である。

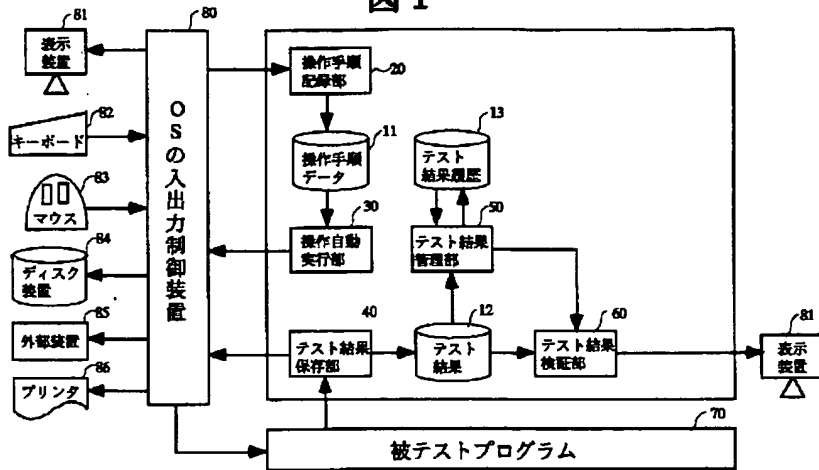
【図8】テスト結果差分情報を画面に表示した結果を示す図である。

【符号の説明】

10…プログラムテスト支援装置、11…操作手順データファイル、12…テスト結果ファイル、13…テスト結果履歴ファイル、20…操作手順記録部、30…操作自動実行部、40…テスト結果保存部、41…画面出力機能、42…ファイル出力機能、43…プリンタ出力機能、44…外部装置出力機能、50…テスト結果管理装置、60…テスト結果検証部、70…被テストプログラム、80…OSの入出力制御部、81…表示装置、82…入力装置、84…外部記憶装置、85…外部装置、86…プリンタ装置、411…出力命令文字列変換機能、601…テスト結果比較部、602…テスト結果差分情報ファイル、603…差分表示部。

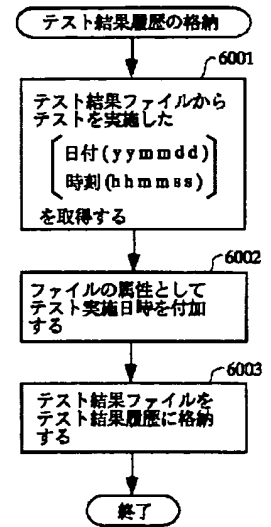
【図1】

図1



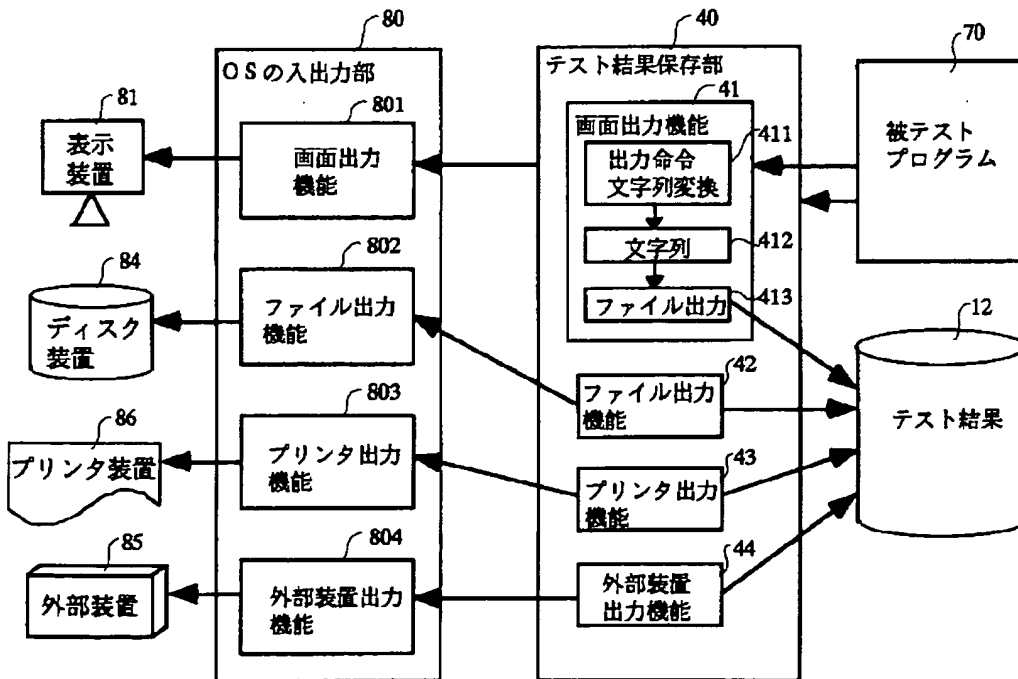
【図6】

図6



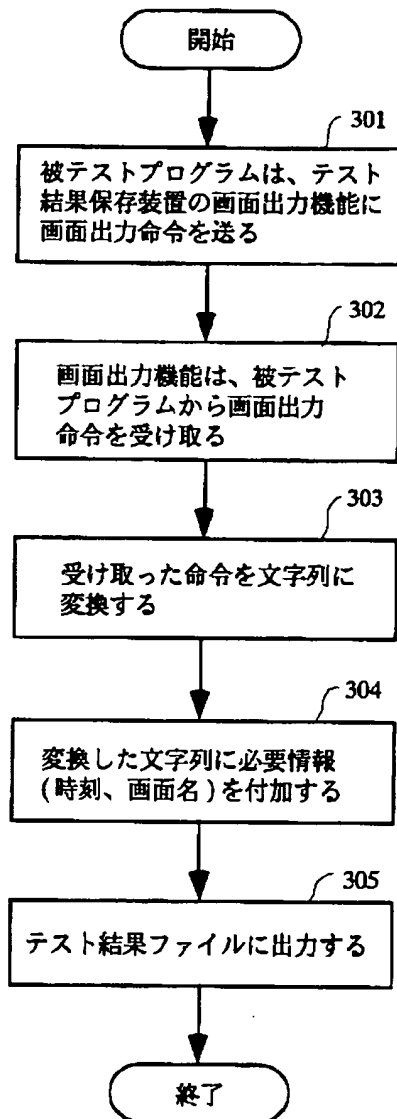
【図2】

図2



【図3】

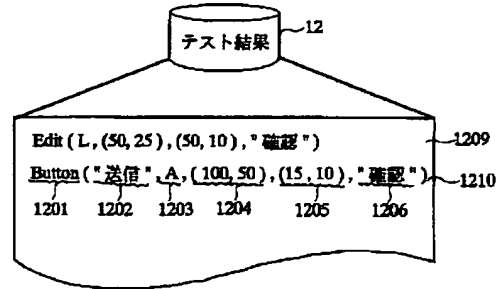
図3



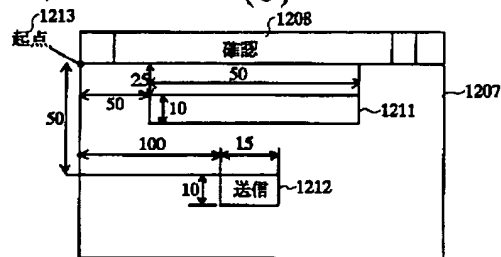
【図5】

図5

(a)

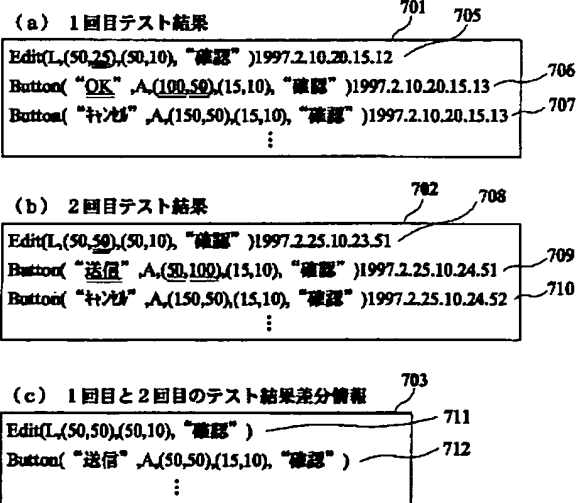


(b)



【図7】

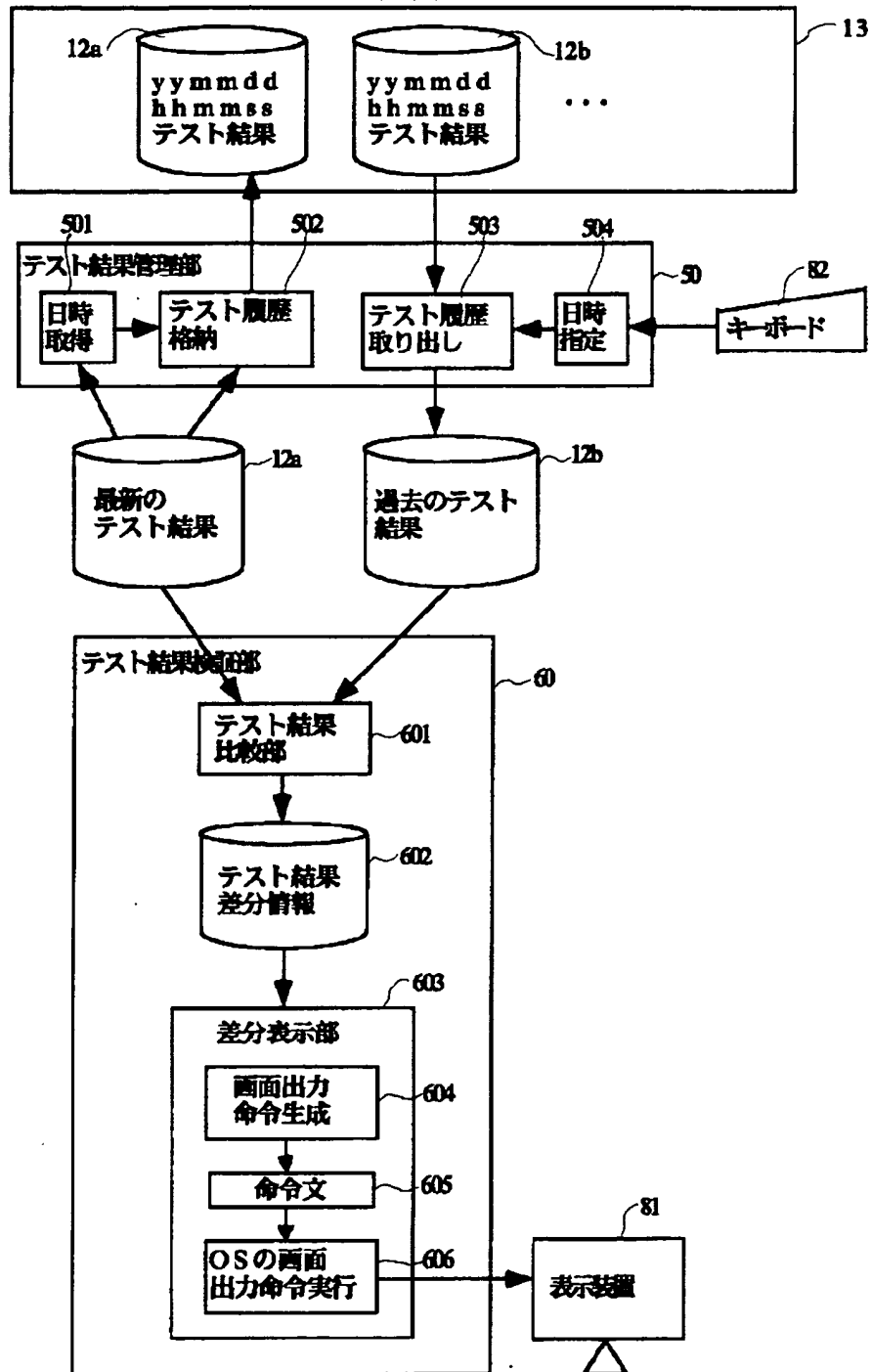
図7



【図4】

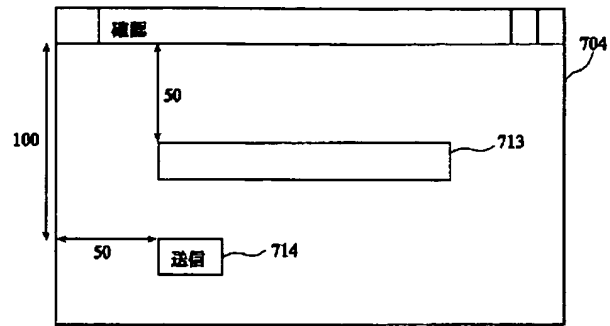
図4

テスト結果履歴



【図 8】

図 8



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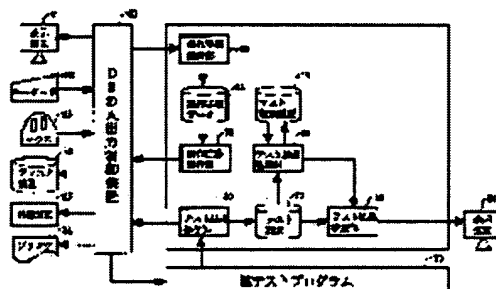
(72)Inventor : SHOMURA TSUTOMU

(54) PROGRAM TEST SUPPORT DEVICE

(57)Abstract:

PROBLEM TO BE SOLVED: To hold all information outputted from a program to be tested in time series to confirm the screen transition and to cope with an unestimated screen change and also to evaluate the deterioration of performance by comparing two test result information of different test times with each other to extract the difference between both information.

SOLUTION: The input information on an operator is acquired from an input/output control part 80 of an OS against a tested program 70 and recorded to an operation procedure data file 11. The 1st test result is obtained from a test result file 12 via a test result management part 50 and transferred to a test result history file 13 before the 2nd test is started. Then the 1st test result A is taken out of the file 13 and compared with the 2nd recorded test result B. A test result verification part 60 outputs the difference between both test results A and B to a display device 81.



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- 3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The operating procedure for testing a test program-ed is saved as operating procedure data. In the program test exchange equipment which gives the saved operating procedure data to a test program-ed, and tests a test program-ed It intervenes between the operating systems which operate a test program-ed according to said operating procedure data. A test-result preservation means to acquire all the information outputted from a test program-ed to time series, and to save it as test-result information with the information on the acquired time of day, A test-result hysteresis preservation means to save the test result of multiple times as test-result hysteresis, Program test exchange equipment characterized by having a comparison means to extract difference by taking out two test-result information that test time of day differs from said test-result hysteresis preservation means, and comparing it, and a display means to display only the information shown by the extracted difference.

[Claim 2] Program test exchange equipment according to claim 1 characterized by having an output instruction character string conversion means to save all the information outputted from the test program-ed saved for said test-result preservation means for said test-result preservation means as character string information on an output instruction format.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the program test exchange equipment which supports the test of the program developed newly, performing menu manipulation.

[0002]

[Description of the Prior Art] Conventionally, what was indicated by JP,5-274186,A is known as this kind of program test exchange equipment.

[0003] If JP,5-274186,A is mentioned as an example and a Prior art is explained, at this JP,5-274186,A (the name of invention: input data processor), logging of the information on an operator's operator guidance will be carried out, and the test of a program will be automated by performing that information again. About a comparative required screen, the key which takes the log of a screen in test actuation is inputted, and hard copy of the screen in the time of being directed is file-ized, and it compares [result / of a test] with the result of the 2nd test.

[0004]

[Problem(s) to be Solved by the Invention] However, if it is in the above-mentioned conventional technique, there are the following troubles.

[0005] (1) The log of a screen is not acquired about a screen without directions of an operator. Therefore, although the actuation which acquires the log about the screen which can predict modification beforehand can be directed, when the visual change which is not predicted breaks out with modification of the program for a test, it cannot respond.

[0006] (2) although it had become the description in JP,5-274186,A to acquire the hard copy of a screen to the field which blinks in a screen after stopping the blink, blinking like the error message of a screen blinked by changing the condition of a screen to the field demanded as a specification -- a thing -- **** -- a thing -- that check will become impossible

[0007] (3) Since the action which acquires the log of a screen is treated on the same level as the operation of a test, neither addition of the order of appearance of a screen and a screen nor the check of the flow of a screen called deletion can be performed.

[0008] (4) In order to acquire the log of a screen, a special key is required, the function which acquires only the information on the screen which the target program outputs when the screen which shows two or more program executions on a display like current is displayed is required, and it is necessary to perform the test independent of the screen which programs other than the purpose output. Moreover, in JP,5-274186,A, in order to acquire all screen information to a log, and for possibility that the information on a screen differs to become high and to test normally when there is a program currently performed to coincidence, it is necessary to consider as the screen where one program outputs the whole display.

[0009] (5) Since the timing of an output is not recordable, it cannot compare that degradation of the engine performance has broken out.

[0010] (6) Variety **** considers [the data outputted / message output / to an external program / not only a screen output but a file output, / depending on the program for a test] the above-mentioned conventional technique to no print-outs.

[0011] The purpose of this invention can cope with it easily also to the visual change which leaves all the information outputted from the program for [, such as a screen, and a file, an external device,] a test to time series, and can check transition of a screen easily, and is not predicted, and is to offer the program test

exchange equipment by which degradation of the engine performance can be evaluated further.

[0012]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention saves the operating procedure for testing a test program-ed as operating procedure data. In the program test exchange equipment which gives the saved operating procedure data to a test program-ed, and tests a test program-ed It intervenes between the operating systems which operate a test program-ed according to said operating procedure data. A test-result preservation means to acquire all the information outputted to a screen, a file, and an external device from a test program-ed to time series, and to save as test-result information with the information on the acquired time of day, A test-result hysteresis preservation means to save the test result of multiple times as test-result hysteresis, It is characterized by having a comparison means to extract difference, and a display means to display only the information shown by the extracted difference by taking out two test-result information that test time of day differs from said test-result hysteresis preservation means, and comparing it.

[0013] Moreover, it is characterized by having an output instruction character string conversion means to save all the information outputted to a screen, a file, and an external device for said test-result preservation means as character string information on an output instruction format from the test program-ed [preservation] saved for said test-result preservation means.

[0014]

[Embodiment of the Invention] Hereafter, this invention is explained to a detail based on the operation gestalt shown in a drawing.

[0015] Drawing 1 is the block diagram showing the operation gestalt of the program test exchange equipment which applied this invention.

[0016] The program test exchange equipment 10 of this operation gestalt The operating procedure data file 11 which recorded operating procedure, the test-result file 12 which stored the information outputted at the time of test activation, when repeating a test several times It is alike and the past test result is made into test-result hysteresis. The information which the saved test-result history file 13, the operating procedure Records Department 20 which records an operator's operating procedure, the actuation automatic activation section 30 which performs actuation automatically based on the operating procedure in the operating procedure data file 11, and the test program 70-ed output It consists of the test-result Management Department 50 which saves the past test result when repeating and performing the test-result preservation section 40 and the test to save, or takes out the past test result for a comparison, and the test-result verification section [the result of the past / result / which was tested and obtained] 60.

[0017] The environment of a computer system where the test program 70-ed set as the object of a test operates is equipped with the external devices 85, such as the external storage 84, such as a disk which stores the pointing equipments 83, such as the input devices 82, such as a keyboard for inputting the indicating equipments 81, such as I/O control unit 80 of an operating system (the following, OS), and a display, an alphabetic character, a command, etc., and a mouse, a file, etc., an external network, and serial interface, and printer equipment 86. In addition, the verification result of the test-result verification section 60 is displayed on a display 81.

[0018] First, the outline of actuation of this operation gestalt is explained.

[0019] An operator's input over the test program 70-ed is acquired from I/O control unit 80 of OS, and the operating procedure Records Department 20 records on the operating procedure data file 11. Before the information which the test program 70-ed outputs passes an instruction to I/O control unit 80 of OS, the test-result preservation section 40 records it on the test-result file 12.

[0020] Before beginning the 2nd test, the 1st test result is acquired from the test-result file 12 using the test-result Management Department 50, and it transmits to the test-result history file 13.

[0021] Based on the operating procedure data which recorded subsequent tests on the operating procedure data file 11 by the 1st test, the actuation automatic activation section 30 sends an instruction to I/O control unit 80 of OS. I/O control unit 80 of OS processes the received instruction like the directions from input devices 82 and the pointing equipments 83, such as a keyboard, and passes it to the test program 70-ed.

[0022] The test-result preservation section 40 records the information which the test program 70-ed outputs on the test-result file 12 like the 1st time. In order to compare with 2nd test-result B test-result A recorded on the 1st time, 1st test-result A is taken out from the test-result history file 13 using the test-result

Management Department 50.

[0023] 1st test-result A and 2nd test-result B which were taken out are used for the test-result verification section 60, and it outputs the difference in a test result to a display 81.

[0024] Drawing 2 is the functional block diagram showing the detail of the function of the test-result preservation section 40. The screen output function which records the instruction which outputs 41 in drawing to a screen on a test result, the file output function which record the instruction which outputs 42 to the file of external storage 84 on a test result, the printer output function which record the instruction which outputs 43 to printer equipment 86, and 44 are the external device output function which records in the instruction which outputs to an external device 85.

[0025] In said screen output function 41, the output instruction character string conversion function to change into a character string the output instruction whose 411 is a detail function inside the screen output function 41, the character string storage area which stores the character string which 412 changed, and 413 are file output functions which output a character string to the test-result file 12.

[0026] On the other hand, in I/O control unit 80 of OS, the screen output function in which 801 carries out the direct output of the contents of the display screen to a display 81, the file output function in which 802 similarly carries out the direct output of the file data etc. to external storage 84, the printer output function in which 803 similarly carries out the direct output of the print data to printer equipment 86, and 804 are external device output functions which similarly carry out the direct output of the external output data to an external device 85.

[0027] Drawing 3 is a flow chart which shows how to record a test result. With reference to drawing 2 and drawing 3, how to record the information on a screen output on the test-result file 12 is explained.

[0028] The test program 70-ed uses the screen output function 801 of I/O control unit 80 of OS, when displaying on a display 81. With this operation gestalt, directly, the test program 70-ed uses the screen output function 41 of the test-result preservation section 40 rather than uses the screen output function 801.

[0029] First, the test program 70-ed sends a screen output instruction to the screen output function 41 of the test-result preservation section 40 (step 301 of drawing 3). If a screen output instruction is received (step 302), the screen output function 41 will change the received instruction into a character string using the output instruction character string conversion function 411, and will set it to the character string area 412 (step 303).

[0030] The reason changed into a character string is for simplifying verification of a test result. Next, after adding required information, such as time of day and a screen name, to the changed character string (step 304), the contents of the character string area 412 are outputted to the test-result file 12 by the file output function 413 (step 305).

[0031] Thereby, it is changed into the character string of an output instruction format, and information, such as time of day and a screen name, is added, and the information which the test program 70-ed outputs to a screen is recorded on the test-result file 12 by time series. By changing into the character string of an output instruction format, and recording on the test-result file 12, memory capacity of the test-result file 12 can be made small compared with the case where it records in a dot image. Moreover, although the item which blinks if the information on a screen is acquired by the image data is correctly unrecordable, the attribute of the drawn alphabetic character or a line is recordable as exact information by recording drawing information for the character string information on an output instruction format (script language), whenever it performs the function which draws an alphabetic character and a line on a screen.

[0032] Drawing 4 is the functional block diagram showing the detail configuration of the test-result Management Department 50 and the test-result verification section 60. 12a in drawing is the newest test result stored in the test-result history file 13, and 12b is the past test result. The module with which 501 acquires the time of test activation from the newest test-result 12a, and 502 are test hysteresis storing modules which store test-result 12a in the test-result history file 13.

[0033] The test hysteresis ejection module which takes out test-result 12b of the past when 503 was specified out of the test-result history file 13, and 504 are time assignment modules which acquire the information on time required as past test-result 12b from an input device 82.

[0034] the test-result comparator which 601 inputs the newest test-result 12a and the past test-result 12b, and outputs the difference of a test result in the test-result verification section 60 on the other hand, and 602 -- the difference of a test result -- the test result which stores information -- difference -- the difference

which calculated an information file and 603 -- the difference which outputs information to a display 81 -- it is a display. this difference -- the interior of a display 603 -- a test result -- difference -- the difference stored in the information file 602 -- it consists of screen output instruction activation modules 606 of OS which outputs the screen output instruction generation module 604 which generates the instruction word for displaying on an indicating equipment 81, the instruction statement storage area 605 which stores the generated instruction statement, and the instruction statement stored in this instruction statement storage area 605 to an indicating equipment 81 from information using I/O control unit 80 of OS.

[0035] Drawing 5 (a) and (b) are drawings showing the contents of the test-result file 12. The detail of the contents from which this drawing (a) is stored in the test-result file 12, and this drawing (b) are the examples of the screen actually outputted to the display 81. 1201 expresses the carbon button in the identifier showing the contents outputted to the screen, and this case. The character string which displays 1202 on a carbon button, the code with which 1203 expresses the format of a carbon button, and 1204 express with x and a y-coordinate the location which displays a carbon button. 1205 expresses the magnitude of a carbon button in x and the direction of y. The unit of a location and magnitude is a dot. 1206 is an identifier for identifying to which screen this carbon button was outputted, and the character string of "a check" which is the name of a screen is used in this case. As for the figure in the screen where 1207 was actually outputted to the display 81, the part as which, as for 1208, the name of a screen is displayed, and drawing, the distance from an origin 1213 is expressed per dot. The record result as which 1209 expresses the text input field, the record result as which 1210 expresses a carbon button, the text input field outputted to the screen where 1211 is actual, and 1212 express the carbon button outputted to the actual screen.

[0036] Like illustration, a carbon button 1212 is specified as the dot location specified by the position coordinate 1204 which displays a carbon button on the basis of an origin 1213 for the information 1205 on the magnitude of x and the direction of y that the magnitude of a carbon button is expressed, and it is indicated by magnitude. According to x in the record result 1209, and the value of a y-coordinate, it is similarly displayed about the text input field 1211.

[0037] Drawing 6 is the flow chart which showed the procedure of storing the test-result hysteresis in the case of performing a multiple-times test in the test-result history file 13. It explains with reference to drawing 4.

[0038] First, the time tested from the newest test-result 12a is acquired by the time acquisition module 501 (step 6001). Next, the acquired test implementation time is added as an attribute of a file (step 6002). Next, the test hysteresis storing module 502 stores the newest test-result 12a in the test-result history file 13 (step 6003).

[0039] Drawing 7 and drawing 8 are drawings explaining actuation of the test-result verification section 60. In drawing 7, 701 is the contents of the 1st test-result file 12, and the double line in drawing shows the contents which changed the value by the 2nd test. 705 is the text input field, the carbon button with which, as for 706, a character string is displayed as O.K., the carbon button with which 707 is displayed on a character string as cancellation, and 702 are the contents of the 2nd test-result file 12, and the double line in drawing shows the contents which changed the 1st value. It is the carbon button with which 708 is displayed on a character string as the text input field, and 709 is displayed as transmission, and output time is added to 705-710. the carbon button with which 710 is displayed on a character string as cancellation, and 703 -- the difference of the 1st time and the 2nd test result -- as for information 602 and 711, the 1st character string and the display position of the text input field where the 1st display position differed from each other, and 712 are different carbon buttons. The difference of the operating time of the whole program is called for by comparing the time interval of the time interval of the output time of the head line of 701, and the output time of a last line, the output time of the head line of 702, and the output time of a last line.

[0040] Moreover, the difference of the operating time of the program in each part is obtained by comparing the time interval of the time interval of the output time of 705, and the output time of 706, the output time of 707, and the output time of 708.

[0041] next, drawing 8 -- setting -- 704 -- a test result -- difference -- as a result of displaying information 703 on a screen, the text input field where, as for 713, the display position was changed, and 714 show the carbon button which changed the character string and display position of a carbon button.

[0042] As mentioned above, according to this operation gestalt, only by text level comparing the contents of the test-result file 12 simply, the part to which the menu manipulation in the test program 70-ed was changed

can be extracted, it can display on a display 81, and a modification part can be checked. Therefore, when the visual change which is not predicted breaks out with modification of the program for a test, it can be coped with easily. Moreover, degradation of the engine performance is detectable in output of a file or data by comparing an output time interval from the information on output time.

[0043] Furthermore, memory capacity of the test-result file 12 can be made small compared with the case where it records in a dot image, by changing into the character string of an output instruction format, and recording on the test-result file 12. Moreover, although the item which blinks if the information on a screen is acquired by the image data is correctly unrecordable, the attribute of the drawn alphabetic character or a line is recordable as exact information by recording drawing information for the character string information on an output instruction format (script language), whenever it performs the function which draws an alphabetic character and a line on a screen.

[0044] Furthermore, program test exchange equipment 10 is made to intervene between I/O control units 80 of OS, since all the information that a test program-ed outputs is acquired, also in the multitasking environment where two or more program execution screens are displayed on the screen, only the print-out of one test program-ed made into the purpose can be acquired, and a test result can be checked.

[0045]

[Effect of the Invention] According to this invention, it can be easily coped with also to the visual change which leaves all the information outputted from the program for [, such as a screen, and a file, an external device,] a test to time series, and can check transition of a screen easily, and is not predicted, and degradation of the engine performance can be further evaluated so that clearly from the above explanation.

[0046] Moreover, program test exchange equipment is made to intervene between the I/O devices of OS, since all the information that a test program-ed outputs is acquired, also in the multitasking environment where two or more program execution screens are displayed on the screen, only the print-out of one test program-ed made into the purpose can be acquired, and a test result can be checked.

[0047] Furthermore, memory capacity of a test-result file can be made small compared with the case where it records in a dot image, by changing into the character string of an output instruction format, and recording on a test-result file. Moreover, although the item which blinks if the information on a screen is acquired by the image data is correctly unrecordable, the attribute of the drawn alphabetic character or a line is recordable as exact information by recording drawing information for the character string information on an output instruction format (script language), whenever it performs the function which draws an alphabetic character and a line on a screen.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the program test exchange equipment which supports the test of the program developed newly, performing menu manipulation.

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PRIOR ART

[Description of the Prior Art] Conventionally, what was indicated by JP,5-274186,A is known as this kind of program test exchange equipment.

[0003] If JP,5-274186,A is mentioned as an example and a Prior art is explained, at this JP,5-274186,A (the name of invention: input data processor), logging of the information on an operator's operator guidance will be carried out, and the test of a program will be automated by performing that information again. About a comparative required screen, the key which takes the log of a screen in test actuation is inputted, and hard copy of the screen in the time of being directed is file-ized, and it compares [result / of a test] with the result of the 2nd test.

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EFFECT OF THE INVENTION

[Effect of the Invention] According to this invention, it can be easily coped with also to the visual change which leaves all the information outputted from the program for [, such as a screen, and a file, an external device,] a test to time series, and can check transition of a screen easily, and is not predicted, and degradation of the engine performance can be further evaluated so that clearly from the above explanation. [0046] Moreover, program test exchange equipment is made to intervene between the I/O devices of OS, since all the information that a test program-ed outputs is acquired, also in the multitasking environment where two or more program execution screens are displayed on the screen, only the print-out of one test program-ed made into the purpose can be acquired, and a test result can be checked.

[0047] Furthermore, memory capacity of a test-result file can be made small compared with the case where it records in a dot image, by changing into the character string of an output instruction format, and recording on a test-result file. Moreover, although the item which blinks if the information on a screen is acquired by the image data is correctly unrecordable, the attribute of the drawn alphabetic character or a line is recordable as exact information by recording drawing information for the character string information on an output instruction format (script language), whenever it performs the function which draws an alphabetic character and a line on a screen.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] However, if it is in the above-mentioned conventional technique, there are the following troubles.

[0005] (1) The log of a screen is not acquired about a screen without directions of an operator. Therefore, although the actuation which acquires the log about the screen which can predict modification beforehand can be directed, when the visual change which is not predicted breaks out with modification of the program for a test, it cannot respond.

[0006] (2) although it had become the description in JP,5-274186,A to acquire the hard copy of a screen to the field which blinks in a screen after stopping the blink, blinking like the error message of a screen blinked by changing the condition of a screen to the field demanded as a specification -- a thing -- **** -- a thing -- that check will become impossible

[0007] (3) Since the action which acquires the log of a screen is treated on the same level as the operation of a test, neither addition of the order of appearance of a screen and a screen nor the check of the flow of a screen called deletion can be performed.

[0008] (4) In order to acquire the log of a screen, a special key is required, the function which acquires only the information on the screen which the target program outputs when the screen which shows two or more program executions on a display like current is displayed is required, and it is necessary to perform the test independent of the screen which programs other than the purpose output. Moreover, in JP,5-274186,A, in order to acquire all screen information to a log, and for possibility that the information on a screen differs to become high and to test normally when there is a program currently performed to coincidence, it is necessary to consider as the screen where one program outputs the whole display.

[0009] (5) Since the timing of an output is not recordable, it cannot compare that degradation of the engine performance has broken out.

[0010] (6) Variety **** considers [the data outputted / message output / to an external program / not only a screen output but a file output, / depending on the program for a test] the above-mentioned conventional technique to no print-outs.

[0011] The purpose of this invention can cope with it easily also to the visual change which leaves all the information outputted from the program for [, such as a screen, and a file, an external device,] a test to time series, and can check transition of a screen easily, and is not predicted, and is to offer the program test exchange equipment by which degradation of the engine performance can be evaluated further.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention saves the operating procedure for testing a test program-ed as operating procedure data. In the program test exchange equipment which gives the saved operating procedure data to a test program-ed, and tests a test program-ed It intervenes between the operating systems which operate a test program-ed according to said operating procedure data. A test-result preservation means to acquire all the information outputted to a screen, a file, and an external device from a test program-ed to time series, and to save as test-result information with the information on the acquired time of day, A test-result hysteresis preservation means to save the test result of multiple times as test-result hysteresis, It is characterized by having a comparison means to extract difference, and a display means to display only the information shown by the extracted difference by taking out two test-result information that test time of day differs from said test-result hysteresis preservation means, and comparing it.

[0013] Moreover, it is characterized by having an output instruction character string conversion means to save all the information outputted to a screen, a file, and an external device for said test-result preservation means as character string information on an output instruction format from the test program-ed [preservation] saved for said test-result preservation means.

[0014]

[Embodiment of the Invention] Hereafter, this invention is explained to a detail based on the operation gestalt shown in a drawing.

[0015] Drawing 1 is the block diagram showing the operation gestalt of the program test exchange equipment which applied this invention.

[0016] The program test exchange equipment 10 of this operation gestalt The operating procedure data file 11 which recorded operating procedure, the test-result file 12 which stored the information outputted at the time of test activation, when repeating a test several times It is alike and the past test result is made into test-result hysteresis. The information which the saved test-result history file 13, the operating procedure Records Department 20 which records an operator's operating procedure, the actuation automatic activation section 30 which performs actuation automatically based on the operating procedure in the operating procedure data file 11, and the test program 70-ed output It consists of the test-result Management Department 50 which saves the past test result when repeating and performing the test-result preservation section 40 and the test to save, or takes out the past test result for a comparison, and the test-result verification section [the result of the past / result / which was tested and obtained] 60.

[0017] The environment of a computer system where the test program 70-ed set as the object of a test operates is equipped with the external devices 85, such as the external storage 84, such as a disk which stores the pointing equipments 83, such as the input devices 82, such as a keyboard for inputting the indicating equipments 81, such as I/O control unit 80 of an operating system (the following, OS), and a display, an alphabetic character, a command, etc., and a mouse, a file, etc., an external network, and serial interface, and printer equipment 86. In addition, the verification result of the test-result verification section 60 is displayed on a display 81.

[0018] First, the outline of actuation of this operation gestalt is explained.

[0019] An operator's input over the test program 70-ed is acquired from I/O control unit 80 of OS, and the operating procedure Records Department 20 records on the operating procedure data file 11. Before the information which the test program 70-ed outputs passes an instruction to I/O control unit 80 of OS, the test-result preservation section 40 records it on the test-result file 12.

[0020] Before beginning the 2nd test, the 1st test result is acquired from the test-result file 12 using the test-result Management Department 50, and it transmits to the test-result history file 13.

[0021] Based on the operating procedure data which recorded subsequent tests on the operating procedure data file 11 by the 1st test, the actuation automatic activation section 30 sends an instruction to I/O control unit 80 of OS. I/O control unit 80 of OS processes the received instruction like the directions from input devices 82 and the pointing equipments 83, such as a keyboard, and passes it to the test program 70-ed.

[0022] The test-result preservation section 40 records the information which the test program 70-ed outputs on the test-result file 12 like the 1st time. In order to compare with 2nd test-result B test-result A recorded on the 1st time, 1st test-result A is taken out from the test-result history file 13 using the test-result Management Department 50.

[0023] 1st test-result A and 2nd test-result B which were taken out are used for the test-result verification section 60, and it outputs the difference in a test result to a display 81.

[0024] Drawing 2 is the functional block diagram showing the detail of the function of the test-result preservation section 40. The screen output function which records the instruction which outputs 41 in drawing to a screen on a test result, the file output function which record the instruction which outputs 42 to the file of external storage 84 on a test result, the printer output function which record the instruction which outputs 43 to printer equipment 86, and 44 are the external device output function which records in the instruction which outputs to an external device 85.

[0025] In said screen output function 41, the output instruction character string conversion function to change into a character string the output instruction whose 411 is a detail function inside the screen output function 41, the character string storage area which stores the character string which 412 changed, and 413 are file output functions which output a character string to the test-result file 12.

[0026] On the other hand, in I/O control unit 80 of OS, the screen output function in which 801 carries out the direct output of the contents of the display screen to a display 81, the file output function in which 802 similarly carries out the direct output of the file data etc. to external storage 84, the printer output function in which 803 similarly carries out the direct output of the print data to printer equipment 86, and 804 are external device output functions which similarly carry out the direct output of the external output data to an external device 85.

[0027] Drawing 3 is a flow chart which shows how to record a test result. With reference to drawing 2 and drawing 3, how to record the information on a screen output on the test-result file 12 is explained.

[0028] The test program 70-ed uses the screen output function 801 of I/O control unit 80 of OS, when displaying on a display 81. With this operation gestalt, directly, the test program 70-ed uses the screen output function 41 of the test-result preservation section 40 rather than uses the screen output function 801.

[0029] First, the test program 70-ed sends a screen output instruction to the screen output function 41 of the test-result preservation section 40 (step 301 of drawing 3). If a screen output instruction is received (step 302), the screen output function 41 will change the received instruction into a character string using the output instruction character string conversion function 411, and will set it to the character string area 412 (step 303).

[0030] The reason changed into a character string is for simplifying verification of a test result. Next, after adding required information, such as time of day and a screen name, to the changed character string (step 304), the contents of the character string area 412 are outputted to the test-result file 12 by the file output function 413 (step 305).

[0031] Thereby, it is changed into the character string of an output instruction format, and information, such as time of day and a screen name, is added, and the information which the test program 70-ed outputs to a screen is recorded on the test-result file 12 by time series. By changing into the character string of an output instruction format, and recording on the test-result file 12, memory capacity of the test-result file 12 can be made small compared with the case where it records in a dot image. Moreover, although the item which blinks if the information on a screen is acquired by the image data is correctly unrecordable, the attribute of the drawn alphabetic character or a line is recordable as exact information by recording drawing information for the character string information on an output instruction format (script language), whenever it performs the function which draws an alphabetic character and a line on a screen.

[0032] Drawing 4 is the functional block diagram showing the detail configuration of the test-result Management Department 50 and the test-result verification section 60. 12a in drawing is the newest test

result stored in the test-result history file 13, and 12b is the past test result. The module with which 501 acquires the time of test activation from the newest test-result 12a, and 502 are test hysteresis storing modules which store test-result 12a in the test-result history file 13.

[0033] The test hysteresis ejection module which takes out test-result 12b of the past when 503 was specified out of the test-result history file 13, and 504 are time assignment modules which acquire the information on time required as past test-result 12b from an input device 82.

[0034] the test-result comparator which 601 inputs the newest test-result 12a and the past test-result 12b, and outputs the difference of a test result in the test-result verification section 60 on the other hand, and 602 — the difference of a test result — the test result which stores information — difference — the difference which calculated an information file and 603 — the difference which outputs information to a display 81 — it is a display. this difference — the interior of a display 603 — a test result — difference — the difference stored in the information file 602 — it consists of screen output instruction activation modules 606 of OS which outputs the screen output instruction generation module 604 which generates the instruction word for displaying on an indicating equipment 81, the instruction statement storage area 605 which stores the generated instruction statement, and the instruction statement stored in this instruction statement storage area 605 to an indicating equipment 81 from information using I/O control unit 80 of OS.

[0035] Drawing 5 (a) and (b) are drawings showing the contents of the test-result file 12. The detail of the contents from which this drawing (a) is stored in the test-result file 12, and this drawing (b) are the examples of the screen actually outputted to the display 81. 1201 expresses the carbon button in the identifier showing the contents outputted to the screen, and this case. The character string which displays 1202 on a carbon button, the code with which 1203 expresses the format of a carbon button, and 1204 express with x and a y-coordinate the location which displays a carbon button. 1205 expresses the magnitude of a carbon button in x and the direction of y. The unit of a location and magnitude is a dot. 1206 is an identifier for identifying to which screen this carbon button was outputted, and the character string of "a check" which is the name of a screen is used in this case. As for the figure in the screen where 1207 was actually outputted to the display 81, the part as which, as for 1208, the name of a screen is displayed, and drawing, the distance from an origin 1213 is expressed per dot. The record result as which 1209 expresses the text input field, the record result as which 1210 expresses a carbon button, the text input field outputted to the screen where 1211 is actual, and 1212 express the carbon button outputted to the actual screen.

[0036] Like illustration, a carbon button 1212 is specified as the dot location specified by the position coordinate 1204 which displays a carbon button on the basis of an origin 1213 for the information 1205 on the magnitude of x and the direction of y that the magnitude of a carbon button is expressed, and it is indicated by magnitude. According to x in the record result 1209, and the value of a y-coordinate, it is similarly displayed about the text input field 1211.

[0037] Drawing 6 is the flow chart which showed the procedure of storing the test-result hysteresis in the case of performing a multiple-times test in the test-result history file 13. It explains with reference to drawing 4.

[0038] First, the time tested from the newest test-result 12a is acquired by the time acquisition module 501 (step 6001). Next, the acquired test implementation time is added as an attribute of a file (step 6002). Next, the test hysteresis storing module 502 stores the newest test-result 12a in the test-result history file 13 (step 6003).

[0039] Drawing 7 and drawing 8 are drawings explaining actuation of the test-result verification section 60. In drawing 7, 701 is the contents of the 1st test-result file 12, and the double line in drawing shows the contents which changed the value by the 2nd test. 705 is the text input field, the carbon button with which, as for 706, a character string is displayed as O.K., the carbon button with which 707 is displayed on a character string as cancellation, and 702 are the contents of the 2nd test-result file 12, and the double line in drawing shows the contents which changed the 1st value. It is the carbon button with which 708 is displayed on a character string as the text input field, and 709 is displayed as transmission, and output time is added to 705-710. the carbon button with which 710 is displayed on a character string as cancellation, and 703 — the difference of the 1st time and the 2nd test result — as for information 602 and 711, the 1st character string and the display position of the text input field where the 1st display position differed from each other, and 712 are different carbon buttons. The difference of the operating time of the whole program is called for by comparing the time interval of the time interval of the output time of the head line of 701, and the output time of a last line, the

output time of the head line of 702, and the output time of a last line.

[0040] Moreover, the difference of the operating time of the program in each part is obtained by comparing the time interval of the time interval of the output time of 705, and the output time of 706, the output time of 707, and the output time of 708.

[0041] next, drawing 8 -- setting -- 704 -- a test result -- difference -- as a result of displaying information 703 on a screen, the text input field where, as for 713, the display position was changed, and 714 show the carbon button which changed the character string and display position of a carbon button.

[0042] As mentioned above, according to this operation gestalt, only by text level comparing the contents of the test-result file 12 simply, the part to which the menu manipulation in the test program 70-ed was changed can be extracted, it can display on a display 81, and a modification part can be checked. Therefore, when the visual change which is not predicted breaks out with modification of the program for a test, it can be coped with easily. Moreover, degradation of the engine performance is detectable in output of a file or data by comparing an output time interval from the information on output time.

[0043] Furthermore, memory capacity of the test-result file 12 can be made small compared with the case where it records in a dot image, by changing into the character string of an output instruction format, and recording on the test-result file 12. Moreover, although the item which blinks if the information on a screen is acquired by the image data is correctly unrecordable, the attribute of the drawn alphabetic character or a line is recordable as exact information by recording drawing information for the character string information on an output instruction format (script language), whenever it performs the function which draws an alphabetic character and a line on a screen.

[0044] Furthermore, program test exchange equipment 10 is made to intervene between I/O control units 80 of OS, since all the information that a test program-ed outputs is acquired, also in the multitasking environment where two or more program execution screens are displayed on the screen, only the print-out of one test program-ed made into the purpose can be acquired, and a test result can be checked.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram showing the operation gestalt of the program test exchange equipment which applied this invention.

[Drawing 2] It is the functional block diagram showing the detail of the function of test-result preservation equipment.

[Drawing 3] It is the flow chart which shows how to record a test result.

[Drawing 4] It is the functional block diagram showing the detail configuration of test-result management equipment and test-result verification equipment.

[Drawing 5] It is drawing showing the contents of the test-result file.

[Drawing 6] It is the flow chart which showed the procedure of storing the test-result hysteresis in the case of performing a multiple-times test in a test-result history file.

[Drawing 7] It is drawing explaining actuation of test-result verification equipment.

[Drawing 8] a test result -- difference -- it is drawing showing the result of having displayed information on the screen.

[Description of Notations]

10 -- Program test exchange equipment, 11 -- Operating procedure data file, 12 -- A test-result file, 13 -- A test-result history file, 20 -- Operating procedure Records Department, 30 -- The actuation automatic activation section, 40 -- The test-result preservation section, 41 -- Screen output function, 42 -- A file output function, 43 -- A printer output function, 44 -- External device output function, 50 -- Test-result management equipment, 60 -- The test-result verification section, 70 -- A test program-ed, 80 -- the I/O control unit of OS, 81 -- display, 82 -- input unit, and 84 -- external storage, 85 -- external device, 86 -- printer equipment, and 411 -- an output instruction character string conversion function, a 601 -- test-result comparator, and a 602 -- test result -- difference -- an information file and 603 -- difference -- a display.

[Translation done.]

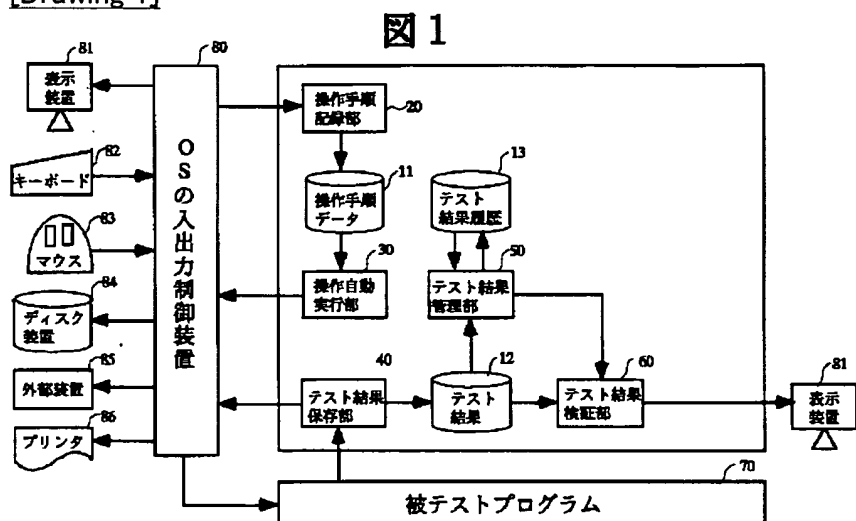
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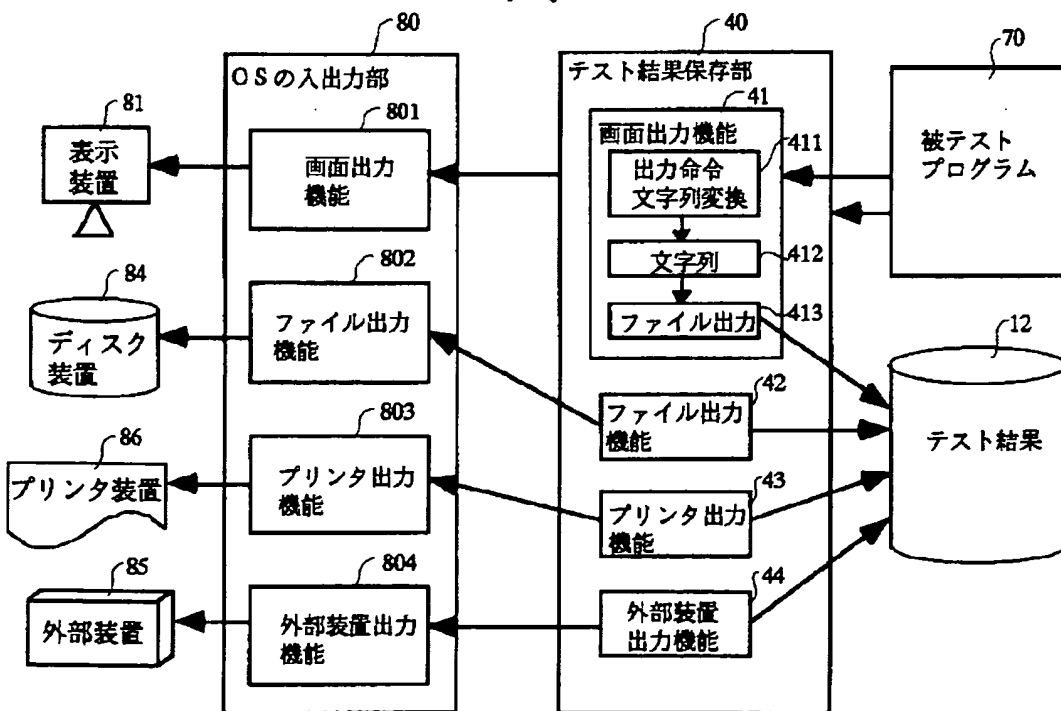
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DRAWINGS

[Drawing 1]

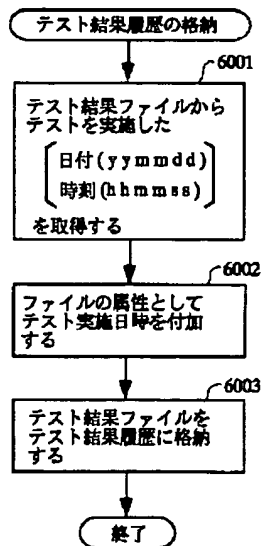


[Drawing 2]

図 2

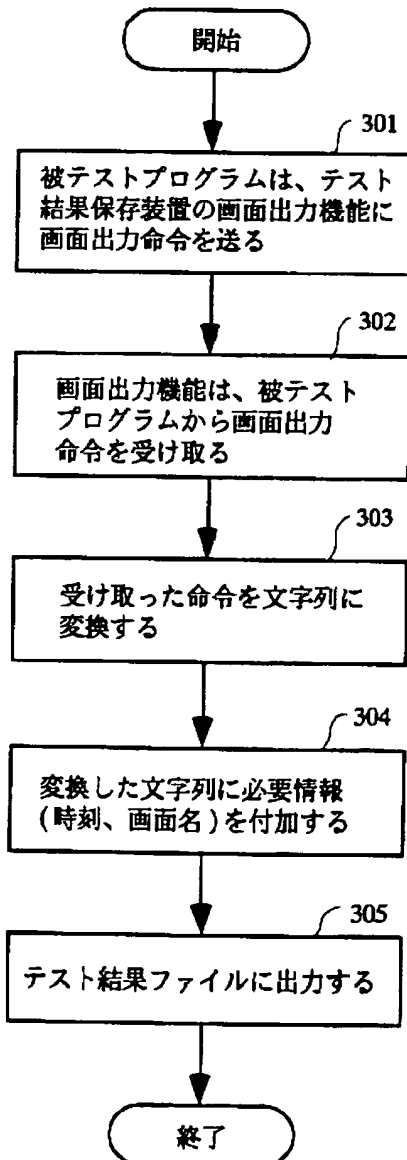
[Drawing 6]

図 6

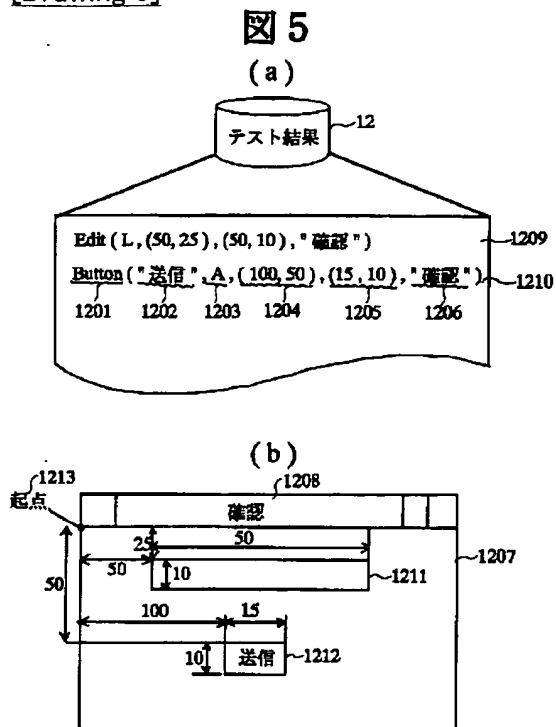


[Drawing 3]

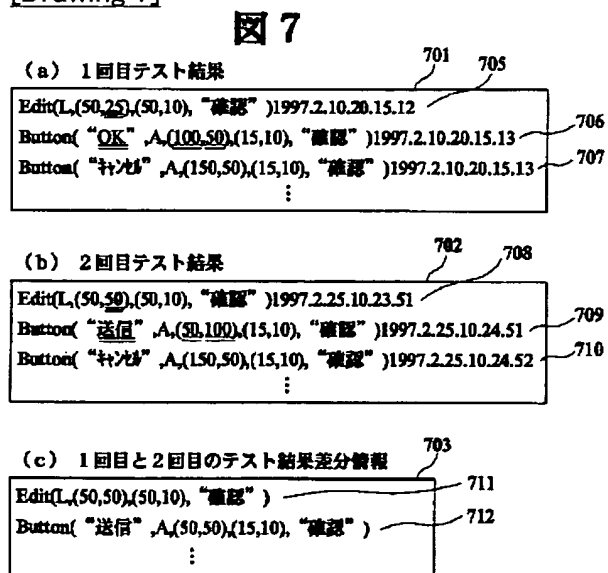
図 3



[Drawing 5]



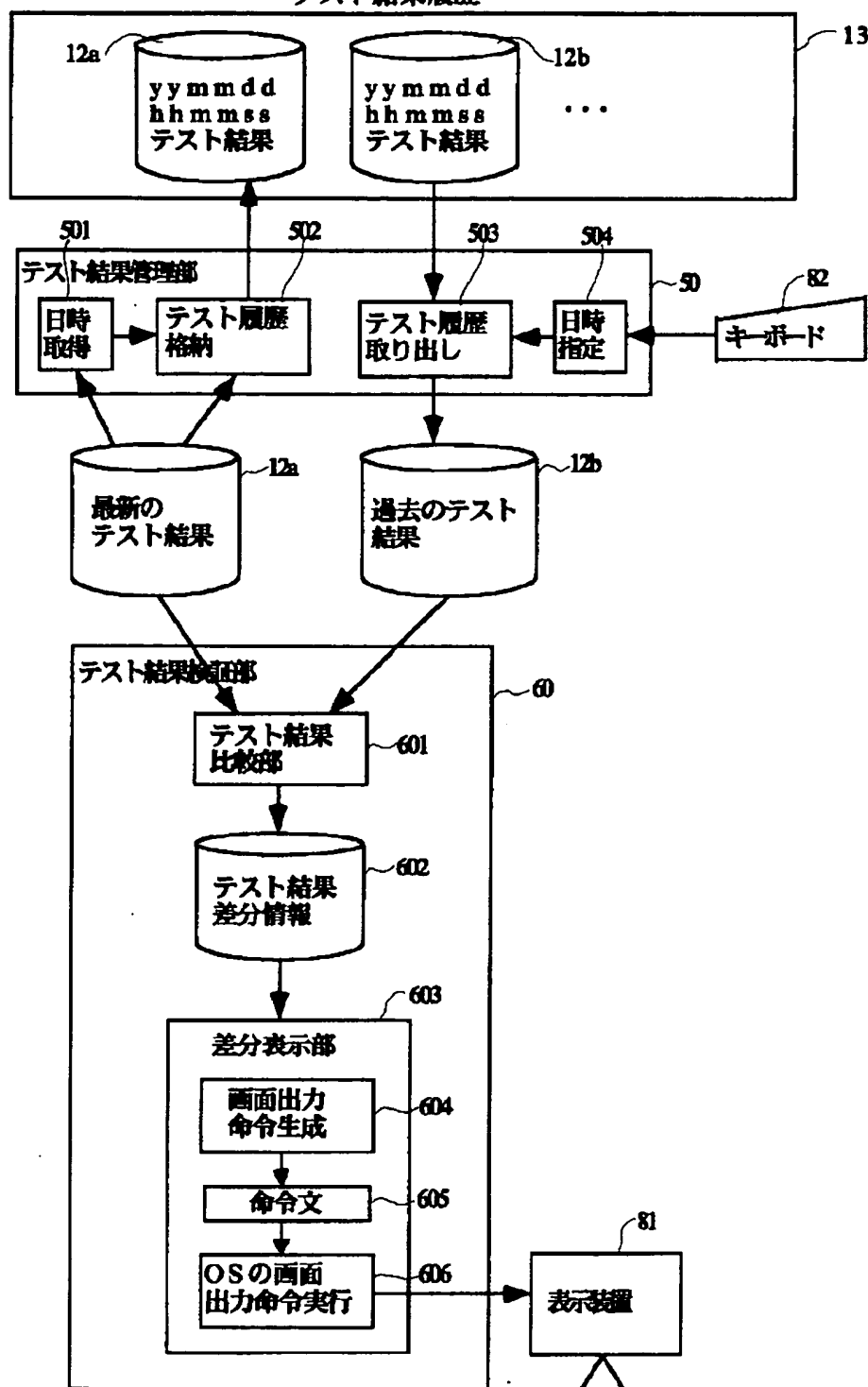
[Drawing 7]



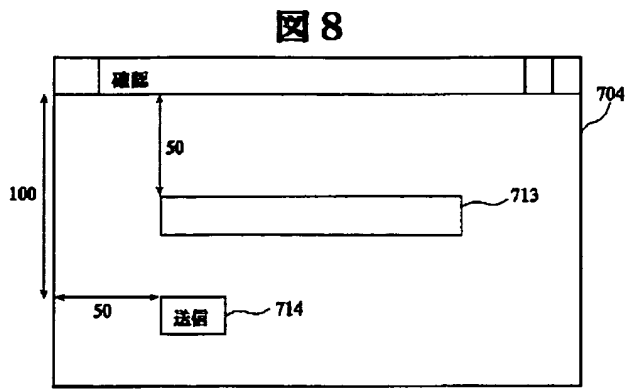
[Drawing 4]

図 4

テスト結果履歴



[Drawing 8]



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